DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species C (Figure 3), claims 1-23, 27-37, and 39-40 in the reply filed on 15 July 2008 is acknowledged.

Information Disclosure Statement

2. The information disclosure statement filed 30 June 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

3. Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 20 recites the same limitations as those recited in claim 6, the claim from which it depends.

Claim Rejections - 35 USC § 102

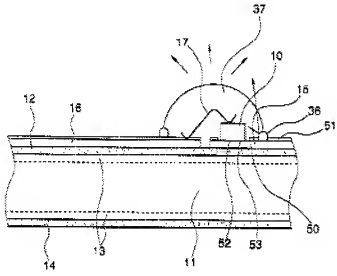
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 21, 39, and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakamoto et al. (US 6,489,637) (hereinafter Sakamoto).

6. **With respect to claim 1,** Sakamoto (e.g. Figure 2) teaches a radiation-emitting and/or radiation-receiving semiconductor component comprising a radiation-emitting and/or radiation-receiving semiconductor chip 10, a molded plastic body 37 which is ***at least partially transmissive*** to an electromagnetic radiation to be emitted and/or received by the semiconductor component (column 7, lines 44-49) and by which the semiconductor chip 10 is at least partially overmolded, and external electrical leads (15, 16) that are electrically connected to electrical contact areas of the semiconductor chip (column 5, lines 56-67), wherein said molded plastic body is made of a silicone molding compound (column 7, lines 48-51)***, and wherein the semiconductor chip is mounted on a flexible lead frame*** (11, 12, 14) (column 5, lines 17-20; column 6, lines 47-50).

FIG. 2



7. **With respect to claim 21,** Sakamoto teaches that the flexible lead frame comprises a carrier film that comprises at least a plastic film and a metal film (column 5, lines 17-20 and 40-43; column 6, lines 47-50).

8. **With respect to claim 39,** Sakamoto (e.g. Figure 2) teaches that the molded plastic body is formed of a single piece of plastic.

9. **With respect to claim 40,** Sakamoto (e.g. Figure 2) teaches a radiation-emitting and/or radiation-receiving semiconductor chip 10, a molded plastic body 37 which is at least partially transmissive to an electromagnetic radiation to be emitted and/or received by the semiconductor component (column 7, lines 44-49) and by which the semiconductor chip 10 is at least partially overmolded, and external electrical leads (15, 16) that are electrically connected to electrical contact areas of the semiconductor chip (column 5, lines 56-67), wherein said molded plastic body is made of a silicone molding compound (column 7, lines 48-51), and wherein the semiconductor chip is mounted on

a flexible lead frame (11, 12, 14) that comprises a plastic material (column 5, lines 17-20 and 40-43; column 6, lines 47-50).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto.

13. **With respect to claims 7 and 8,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to specify the footprint dimension or the component height. However, differences in footprint dimension/component height will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such dimensions are critical. A change in size is generally recognized as being within the level or ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

It is noted that the specification contains no disclosure of either the critical nature of the claimed curing time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen specified variables are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Since the applicant has not established the criticality of the footprint dimension/component height, it would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the semiconductor component of Sakamoto.

14. Claims 2-4, 10-12, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Bank et al. (US 3,971,747) (hereinafter Bank).

15. **With respect to claim 2,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that the silicone molding compound has a curing time of 10 minutes or less. Bank teaches that a curing time of about 30 minutes or less is preferred (column 11, lines 2-6) in order to provide an improved silicone-epoxy molding compound (column 1, lines 42-48). Moreover, differences in curing time will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such curing time is critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

It is noted that the specification contains no disclosure of either the critical nature of the claimed curing time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen specified variables are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Since the applicant has not established the criticality of the silicone molding compound curing time, and this curing time has been in common use in similar devices in the art (e.g. Nakamura et al., JP 08335719 abstract), it would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the semiconductor component of Sakamoto.

16. **With respect to claim 3,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that the silicone molding compound has a hardness when cured of 65 Shore D or more. Bank teaches that a silicone molding compound has a hardness when cured of 65 Shore D or more (column 17, lines 1-11 and 20-23) in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the silicone molding compound of Bank for the benefit of improving the humidity resistance in electrical insulation.

17. **With respect to claim 4,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that the silicone molding compound is a silicone composite material. Bank teaches a silicone molding compound that is a silicone composite material in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the silicone molding compound of Bank for the benefit of improving the humidity resistance in electrical insulation.

18. **With respect to claim 10,** Bank teaches that the silicone molding compound has a hardness when cured of 65 Shore D or more (column 17, lines 1-11 and 20-23).

19. **With respect to claims 11 and 12,** Bank teaches that the silicone molding compound is a silicone composite material (column 1, lines 20-24 and 42-43).

20. **With respect to claim 27,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that the silicone molding compound comprises an inorganic filling compound. Bank teaches that a silicone molding compound comprises an inorganic filling compound (column 11, lines 44-67) in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the silicone molding compound of Bank having an inorganic filling compound for the benefit of improving the humidity resistance in electrical insulation.

21. **With respect to claim 28,** Bank teaches that the filling compound comprises at least one of TiO_2, Zro_2, and α–Al_2O_3 (column 11, lines 60-64).

22. Claims 5, 6, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of McNulty et al. (US 2002/0180351) (hereinafter McNulty).

23. **With respect to claim 5,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that said silicone molding compound contains a conversion material that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range. McNulty teaches that a silicone molding compound contains a conversion material (phosphor) that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range ([0002] – [0004], [0021]) in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the conversion material of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

24. **With respect to claim 6,** Sakamoto teaches all of the limitations of claim 1 above.

Sakamoto fails to teach that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum. McNulty teaches that a semiconductor chip emits electromagnetic radiation in the blue of ultraviolet region of the spectrum in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the semiconductor chip of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

25. **With respect to claims 19 and 20,** McNulty teaches that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum [0008].

26. Claims 13-15 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Bank as applied to claims 2-4 above, respectively, and further in view of McNulty.

27. **With respect to claims 13-15,** Sakamoto as modified by Bank teaches all of the limitations of claims 2-4 as addressed above.

Sakamoto as modified by Bank fails to teach that said silicone molding compound contains a conversion material that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range. McNulty teaches that a silicone molding compound contains a conversion material (phosphor) that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is

different from the first wavelength range ([0002] – [0004], [0021]) in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Bank with the conversion material of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

28. **With respect to claims 16-18,** Sakamoto as modified by Bank teaches all of the limitations of claims 2-4 as addressed above.

Sakamoto as modified by Bank fails to teach that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum. McNulty teaches that a semiconductor chip emits electromagnetic radiation in the blue of ultraviolet region of the spectrum in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Bank with the semiconductor chip of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

29. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Huber (US 6,088,901) (hereinafter Huber).

30. **With respect to claims 22 and 23,** Sakamoto teaches all of the limitations of claim 21 above.

Sakamoto fails to teach that the plastic film has an opening and the semiconductor chip is bonded to the metal film through the opening. Huber (e.g. Figure 3) teaches a flexible lead frame comprising a carrier film that comprises at least a plastic film 15 and a metal film 20, wherein the plastic film 15 has an opening 16 and the semiconductor chip 23 is bonded to the metal film (through wirebonds 24) through the opening in order to provide a carrier substrate for semiconductor chips that can withstand bending loads (column 1, lines 27-31 and 61-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the flexible lead frame of Huber having a plastic film with an opening for the benefit of providing a carrier substrate for semiconductor chips that can withstand bending loads.

31. Claims 9, 29, 30, 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah (US 6,936,855) (hereinafter Harrah) in view of Leung et al. (US 2005/0062140) (hereinafter Leung).

32. **With respect to claim 9,** Harrah (e.g. Figure 1) teaches a method of making a ***plurality of radiation-emitting and/or radiation receiving semiconductor components comprising a radiation-emitting and/or radiation-receiving semiconductor chip*** (10, 11), ***a molded plastic body*** (70, 71) ***which is transmissive to an electromagnetic radiation to be emitted and/or received by the semiconductor component and by which the semiconductor chip is at least partially overmolded*** (column 7, lines 22-26), ***and external electrical leads*** (40 not

encapsulated) ***that are electrically connected to electrical contact areas of the semiconductor chip,*** wherein

- The semiconductor chip (10, 11) is attached to a metallic ***lead frame*** 40, a carrier substrate or a ***flexible lead frame*** (40, 50) comprising the external electrical leads,
- The semiconductor chip, including subregions of the ***lead frame***, the carrier substrate or the ***flexible lead frame***, is placed in a cavity of an injection mold (column 7, lines 17-45),
- Silicone molding compound is injected into the cavity via an injection molding process or a transfer molding process (column 7, lines 40-45)

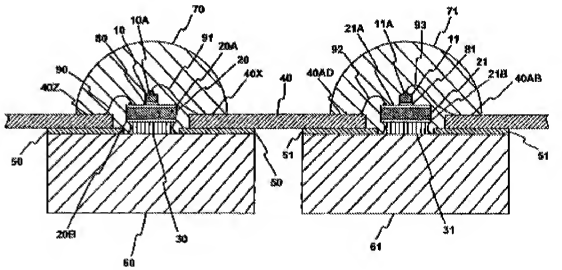


FIGURE 1

Harrah fails to teach that the silicone molding compound is cured in the cavity at least such that a shape-stable molded plastic part is formed. Leung teaches that a silicone molding compound is cured in a cavity at least such that a shape-stable molded

plastic part is formed ([0015], [0045]) in order to provide a method for coating semiconductor devices with a coating material having conversion particles that allows for the reproduction of coated semiconductor devices having coating layer geometry and thickness that are substantially the same [0013].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the method of Harrah with the curing step of Leung for the benefit of providing a method for coating semiconductor devices with a coating material having conversion particles that allows for the reproduction of coated semiconductor devices having coating layer geometry and thickness that are substantially the same.

33. **With respect to claim 29,** Harrah teaches that each semiconductor chip including subregions of the lead frame, the carrier substrate, or the flexible lead frame is placed in a respective cavity of the injection mold and an injection channel is led through one or more semiconductor components (column 7, lines 17-45).

34. **With respect to claim 30,** Leung teaches that a plurality of semiconductor components is placed in a single cavity of the injection mold [0015].

35. **With respect to claim 32,** Harrah teaches that the semiconductor chip is attached to a flexible lead frame formed by a carrier film (column 5, lines 45-60).

36. **With respect to claim 33,** Harrah teaches that forming the carrier film comprises forming a laminate comprising a plastic film 50 and a metal film 40.

37. **With respect to claim 34,** Harrah teaches that forming the carrier film further comprises stamping the metal film to define a cathode and an anode for the semiconductor chip (column 5, lines 55-60).

38. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah in view of Leung as applied to claim9 above, and further in view of Bank.

39. **With respect to claim 31,** Harrah as modified by Leung teaches all of the limitations of claim 9 above.

Harrah as modified by Leung fails to teach that the silicone molding compound has a curing time of 10 minutes or less. Bank teaches that a curing time of about 30 minutes or less is preferred (column 11, lines 2-6) in order to provide an improved silicone-epoxy molding compound (column 1, lines 42-48). Moreover, differences in curing time will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such curing time is critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

It is noted that the specification contains no disclosure of either the critical nature of the claimed curing time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen specified

variables are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Since the applicant has not established the criticality of the silicone molding compound curing time, and this curing time has been in common use in similar devices in the art (e.g. Nakamura et al., JP 08335719 abstract), it would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the method of Harrah as modified by Leung.

40. Claims 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah in view of Leung as applied to claim 33 above, and further in view of Huber.

41. **With respect to claims 35 and 36,** Harrah as modified by Leung teaches all of the limitations of claim 34 above.

Harrah as modified by Leung fails to teach that forming the carrier film further comprises stamping openings into the plastic film, the openings being arranged over the cathode and the anode. Huber (e.g. Figure 3) teaches that forming a carrier film comprises stamping openings 16 into a plastic film 15, the openings being arranged over the cathode and the anode (column 4, lines 20-23) in order to provide an additional increase in bending stiffness (column 3, lines 55-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the method of Harrah as modified by Leung with the

stamping step of Huber for the benefit of providing an additional increase in bending stiffness.

42. **With respect to claim 37,** Huber (e.g. Figure 3) teaches that the semiconductor chip is bonded to the cathode through one of the openings.

Response to Arguments

43. Applicant's arguments with respect to claims 1, 9, and their dependencies have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

44. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Wendy Kuo whose telephone number is (571)270-1859. The examiner can normally be reached Monday through Friday 7:00 AM to 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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